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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/593,633
Filing Date: September 21, 2006
Appellant(s): YAMANE ET AL.

Thomas M. Hunter
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 5/17/2010 appealing from the Office action mailed 10/14/2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1 and 3-9

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

2004/0085772

DAICHOU ET AL

05-2004

Alger, Mark, "Diallyl Phthalate" in POLYMER SCIENCE DICTIONARY, 2nd ed., Springer, 1997.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Issue A – The rejection of claims 1 and 4-9 under 35 U.S.C. 35 U.S.C. 103(a) as being unpatentable over Daichou *et alli* (US 2004/0085772 A1) in view of Alger (Polymer Science Dictionary).

Regarding claims 1 and 8: Daichou teaches a lamp reflector (ti.), comprising a bulk molding compound ("BCM") which comprises unsaturated polyester, crosslinking agent, and glass fiber (par. 2). Example 3 teaches

- i) 24 parts polyester ("IPA/Man/PG" and "PMMA"),
- ii) 11 parts crosslinking agent ("styrene"),
- iii) 11 parts hollow glass spheres, and
- iv) 27 parts inorganic filler at a size of 6 μm ("calcium carbonate") (tbl. 1).

After recalculating by a factor of 4.166, which would make 100 parts of the polyester, the following amounts result:

- i) 100 parts polyester ("IPA/Man/PG" and "PMMA"),
- ii) 45.83 parts crosslinking agent ("styrene"),
- iii) 45.83 parts hollow glass spheres, and
- iv) 112.5 parts inorganic filler at a size of 6 μm .

These amounts all fall within the claimed ranges. Further, Daichou teaches that the pressure at which the hollow spheres will fail is 40 MPa (par. 42). The examiner calculates that the pressure resistance for the hollow glass spheres of the instant invention is $4,000 \cdot 10^4 \text{ N/m}^2$.

Finally, Daichou teaches that crosslinker comprises styrene and diallyl phthalate but there is no mention of what amount of each is present in the composition (par. 29).

Therefore, appellants' attention is directed to Alger, which teaches:

"The monomer [, diallyl phthalate,] is sometimes used to replace styrene in the crosslinking of unsaturated polyester resins to give products with greater heat resistance."

Further, one of ordinary skill in the art would expect the crosslinking density to increase with diallyl phthalate compared to styrene owing to the number of unsaturated sites. Therefore,

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one has motivation to substitute part of the styrene crosslinking agent in Daichou with an amount of diallyl phthalate proportional to the amount of heat resistance and crosslinking density—which one of ordinary skill in the art would expect to contribute to hardness—gained. Therefore, it would have been obvious at the time of the invention for one of ordinary skill in the art to replace part of the styrene in Daichou with an amount appropriate to optimize the heat resistance and cross-linking density of the resultant crosslinked polyester.

Regarding claim 4: The calcium carbonate inorganic filler of example 3 has an average particle size of 6 microns (tbl. 1).

Regarding claim 5: The hollow glass spheres have a specific gravity of 0.6 (tbl. 1).

Regarding claims 6-7 and 9: The courts have stated that a chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical or substantially identical chemical structure, the properties appellant discloses and/or claims are necessarily present. *In re Spada*, 911 F.2d 705, 15 USPQ2d 1655, (Fed. Cir. 1990). See also *In re Best*, 562 F.2d 1252, 195 USPQ 430, (CCPA 1977). "Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established." Further, if it is the appellant's position that this would not be the case: (1) evidence would need to be provided to support the appellant's position; and (2) it would be the Office's position that the application contains inadequate disclosure that there is no teaching as to how to obtain the claimed properties with only the claimed ingredients.

Issue B – The rejection of claim 3 under 35 U.S.C. 103(a) as being unpatentable over Daichou et alli (US 2004/0085772 A1) in view of Alger (Polymer Science Dictionary) and Wada et alli (US 4,052,358).

Regarding claim 3: As discussed in paragraphs 4-7, Daichou in view of Alger render obvious a composition comprising unsaturated polyester and crosslinker, wherein the only limitation of said polyester is that it has a glass transition temperature of at least 150 °C (par. 29). Therefore, Daichou is open to using virtually any unsaturated polyester.

Wada teaches an unsaturated polyester resin that exhibits low-shrinkage, excellent colorability, workability, and storage stability, and is useful making bulk molding compounds (ti.; c. 5, ll. 3-42). From examples 2a-2d, one can extract the following formulation: 100 parts polybasic monomers, comprising 30-70 wt. % neopentyl glycol, 5-55 wt. % propylene glycol, and 10-30 wt. % hydrogenated bisphenol A; and 100 parts polyacidic monomers, comprising 100% maleic anhydride or fumaric acid.

Given the aforementioned benefits, one of ordinary skill in the art would have motivation to select Wada as the unsaturated polyester to use in Daichou. This combination of Wada in view of Daichou gives an unsaturated polyester composition whose formulation overlaps with the instant claims'. The claimed range would have been obvious to one having ordinary skill in the art at the time the invention was made, since it has been held that claiming an overlapping portion of the range taught in the prior is a *prima facie* case of obviousness. See *In re Malagari*, 182 USPQ 549 and MPEP 2144.05 (I). Therefore, it would have been obvious at the time of the invention for one of ordinary skill in the art to substitute Wada's polyester into Daichou to enhance the physical properties of Daichou, thereby arriving at the instant claims.

(10) Response to Argument

Response to Issue A – The rejection of claims 1 and 4-9 under 35 U.S.C. 35

U.S.C. 103(a) as being unpatentable over Daichou *et alli* (US 2004/0085772 A1) in view of Alger (Polymer Science Dictionary).

Appellants argue the current rejection fails to render obvious the claimed invention because although Daichou et al teach crosslinking agent comprising (A) diallyl phthalate and (B) (A) styrene, it would not be obvious to use a mixture of the two, let alone the claimed (A):(B) ratio.

Instead, appellants assert that

- i) based on the teachings of Alger, one of ordinary skill would be motivated to only use (A) in *replacement* of (B) the styrene monomer – not a mixture of the two.
- ii) Even if it were obvious to use mixtures of (A) and (B), the prior art fails to appreciate the unexpected advantage gained in both heat resistance and gloss properties when using the claimed (A):(B) ratio. Appellants direct the examiner's attention to comparative examples 10 and 15 for support.

Regarding issue i), it is noted that Alger uses the language “[diallyl phthalate] is sometimes use to *replace* styrene”, however, the primary reference recognizes using *mixtures* of styrene and diallyl phthalate for the crosslinking agent (Paragraph 29). Additionally, it is prima face obvious to combine individually old ingredients each of which is taught by the prior art to be useful for the same purpose – i.e. crosslinking agents – in order to form a third composition which is to be used for the very same purpose. *In re Kerkhoven* 205 USPQ 1069.

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The examiner would also like to point out that one having basic knowledge of polymer science would understand that as the amount of (A) increases relative to (B), the degree of branching in the final polymer also increases. As the amount of branching increases, the cured polymer exhibits less thermoplasticity and resembles more of a thermoset polymer. By using a mixture of (A) and (B), it gives the user better control of how to modify the desired properties of the final polymer – i.e. whether it should resemble a thermoplastic or a thermoset.

Regarding issue ii), as a preliminary measure, it should be noted that one having ordinary skill in the art would understand that as a polymer resembles more of a thermoset and not a thermoplastic, the heat resistance of said polymer is enhanced. Arriving improved heat resistance upon combining (A) diallyl phthalate with (B) styrene is not unexpected since it decreases the thermoplasticity of the final polymer in favor of a thermoset composition.

Appellants comparative examples 10 and 15, which show that heat resistance can be modified separate from gloss properties, have been noted. However, these examples fail to establish that the claimed (A):(B) ratio provides an unexpected improvement in properties. The (A):(B) ratios of comparative examples 10 and 15 are *identical* to the (A):(B) ratios of inventive examples 18-25. The fact that both superior and inferior properties are obtained when using the same (A):(B) ratio shows the unexpected advantage is not attributable to the claimed (A):(B) ratio.

Finally, of all the 29 inventive examples and 18 comparative examples, only one example uses a diallyl phthalate prepolymer for (A). Similarly, no examples use methacrylate or triallylisocyanurate for component (B). Even if appellants maintain the examples provide evidence for a unexpected advantage based on the ratio of (A):(B), said examples fail to

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overcome the current prima facie case of obviousness because superiority must pertain to the full extent of the subject matter being claimed. *In re Ackermann*, 170 USPQ 340; *In re Chupp* 2 USPQ2d 1437, 1440; *In re Murch*, 175 USPQ 89; *Ex Parte A*, 17 USPQ2d 1719. Accordingly, it has been held that to overcome a case of prima facie obviousness, a claim must be commensurate in scope with any showing of unexpected results. *In re Greenfield*, 197 USPQ 227.

Without data comparing against all of the (A) and (B) compounds listed in claim 1, it is impossible to know whether appellants' alleged unexpected advantage is obtained when operating at the full breadth of claim 1. For example the claimed (B) component comprises either a single unsaturated group: styrene or methyl methacrylate, or three unsaturated groups: triallylisocyanurate. Compounds having a difference of two functional groups will impart different degrees of branching and material properties in the final cured polymer.

Response to Issue B – The rejection of claim 3 under 35 U.S.C. 103(a) as being unpatentable over Daichou *et alli* (US 2004/0085772 A1) in view of Alger (Polymer Science Dictionary) and Wada *et alli* (US 4,052,358).

Appellants' comments have been rendered moot in view of the discussion set forth in the Response to Issue B discussed above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

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Respectfully submitted,

/Benjamin J Gillespie/
Examiner, Art Unit 1796

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